

## AEROLOGICAL OBSERVATIONS

[Aerological Division, D. M. Little, in charge]

By L. T. SAMUELS

Free-air temperatures for February, as shown in table 1, averaged considerably below normal at Cleveland, the departures decreasing in magnitude with increase in elevation. At the other stations the temperatures were above normal with the exception of the lower levels at Pembina. Relative humidity departures were small and of no particular significance.

Free-air resultant winds for the month in general did not differ appreciably from the normals. The largest deviations occurred on the Pacific coast where southerly components predominated. Resultant velocities were close to normal over the country as a whole.

TABLE 1.—Free-air temperatures and relative humidities obtained by airplanes during February 1934

## TEMPERATURE (°C.)

Altitude (meters) m.s.l.	Cleveland, Ohio <sup>1</sup> (246 meters)		Dallas, Tex. <sup>2</sup> (146 meters)		Omaha, Nebr. <sup>3</sup> (300 meters)		Pembina, N.Dak. <sup>4</sup> (243 meters)		San Diego, Calif. <sup>5</sup> (5 meters)	
	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal
Surface.....	-11.2	(°)	5.7	(°)	-5.4	(°)	-16.9	(°)	14.5	+1.4
500.....	-9.1	(°)	8.3	(°)	-3.9	(°)	-14.0	(°)	12.7	+0.7
1,000.....	-9.8	-5.2	7.4	+0.2	-1.9	+1.5	-12.2	-1.8	11.5	+1.0
1,500.....	-10.5	-5.0	7.0	+1.1	-1.3	+1.7	-12.0	-2.0		
2,000.....	-11.2	-4.2	5.7	+1.7	-2.2	+2.1	-12.9	-1.3	7.9	+2.0
2,500.....	-12.1	-3.3	3.3	+1.7	-4.2	+2.3	-14.6	-0.4		
3,000.....	-13.9	-2.7	1.0	+1.9	-6.8	+2.3	-16.6	+0.3	2.2	+1.3
4,000.....	-17.5	-0.4	-5.4	+0.4	-12.5	+2.2	-20.9	+1.5	-4.7	+1.3
5,000.....	-22.5	+1.2	-12.4	-0.9	-18.4	+3.1	-26.4	+1.9		

## RELATIVE HUMIDITY (PERCENT)

Altitude (meters) m.s.l.	Cleveland, Ohio <sup>1</sup> (246 meters)		Dallas, Tex. <sup>2</sup> (146 meters)		Omaha, Nebr. <sup>3</sup> (300 meters)		Pembina, N.Dak. <sup>4</sup> (243 meters)		San Diego, Calif. <sup>5</sup> (5 meters)	
	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal
Surface.....	82	(%)	82	(%)	78	(%)	87	(%)	77	+8
500.....	73	(%)	67	(%)	75	(%)	78	(%)	76	+12
1,000.....	69	-2	62	+3	64	0	73	+4	63	+7
1,500.....	63	+1	53	+1	57	0	68	+7		
2,000.....	62	+5	48	+1	57	+4	63	+4	37	-4
2,500.....	60	+4	43	-1	60	+8	58	-1		
3,000.....	58	+1	37	-5	58	+6	55	-3	34	+3
4,000.....	57	0	35	-1	49	-1	50	-5	35	+3
5,000.....	56	-2	34	+2	44	-6	50	-7		

<sup>1</sup> Temperature departures based on normals determined by extrapolating latitudinally those of Royal Center, Ind., and Due West, S.C. Humidity departures based on normals of Royal Center, Ind.

<sup>2</sup> Temperature departures based on normals determined by interpolating latitudinally those of Groesbeck, Tex., and Broken Arrow, Okla. Humidity departures based on normals of Groesbeck, Tex.

<sup>3</sup> Temperature and humidity departures based on normals of Drexel, Nebr.

<sup>4</sup> Temperature departures based on normals determined by extrapolating latitudinally those of Ellendale, N.Dak., and Drexel, Nebr. Humidity departures based on normals of Ellendale, N.Dak.

<sup>5</sup> Naval air station.

<sup>6</sup> Surface and 500-meter level departures omitted because of difference in time of day between airplane observations and those of kites upon which the normals are based.

Times of observations: Weather Bureau, 5 a.m.; Navy, 7 a.m.; Massachusetts Institute of Technology, 8 a.m.; eastern standard time.

TABLE 2.—Free-air resultant winds (meters per second) based on pilot balloon observations made near 7 a.m. (E.S.T.) during February 1934

[Wind from N=360°, E=90°, etc.]

Altitude (meters) m.s.l.	Albuquerque, N. Mex. (1,554 meters)		Atlanta, Ga. (309 meters)		Bismarck, N.Dak. (518 meters)		Brownsville, Tex. (7 meters)		Burlington, Vt. (132 meters)		Cheyenne, Wyo. (1,873 meters)		Chicago, Ill. (192 meters)		Cleveland, Ohio (245 meters)		Dallas, Tex. (154 meters)		Havre, Mont. (762 meters)		Jacksonville, Fla. (14 meters)		Key West, Fla. (11 meters)	
	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity
Surface.....	323	1.3	334	2.3	308	1.1	2	0.5	197	0.8	286	4.1	323	1.0	222	1.5	300	0.7	257	1.8	327	1.8	56	1.4
500.....			334	3.3			161	3.9	265	3.3			295	2.5	260	3.4	246	2.3			339	3.3	76	2.1
1,000.....			326	6.0	309	6.4	169	4.0	297	7.7			280	5.8	286	5.3	245	3.6	260	4.8	267	3.3	101	5.5
1,500.....			306	10.1	306	10.4	207	2.0	303	10.3			289	8.3	281	7.4	271	5.1	283	8.4	271	6.4	264	2.7
2,000.....	301	2.9	299	11.4	312	13.0	260	2.9	307	11.0	285	6.0	291	11.4	283	9.8	292	5.9	291	9.1	285	7.5	269	3.0
2,500.....	287	4.1	296	12.1	308	11.4	289	6.6	307	13.1	293	9.3	296	13.7	284	13.3	296	7.1	290	10.7	281	8.4	275	4.4
3,000.....	283	5.2	288	12.0	302	11.2	277	7.9	290	11.8	298	9.4	299	14.2	289	13.7	311	8.4	297	11.6	281	9.6	269	6.2
4,000.....	271	6.1					273	8.5			303	7.7			295	15.3							295	7.4
5,000.....	279	6.2									302	3.8							305	11.9				

TABLE 2.—Free-air resultant winds (meters per second) based on pilot balloon observations made near 7 a.m. (E.S.T.) during February, 1934—Continued

Altitude (meters) m.s.l.	Los Angeles, Calif. (127 meters)		Medford, Oreg. (410 meters)		Memphis, Tenn. (83 meters)		New Orleans, La. (1 meter)		Oakland, Calif. (8 meters)		Oklahoma City, Okla. (402 meters)		Omaha, Nebr. (306 meters)		Phoenix, Ariz. (338 meters)		Salt Lake City, Utah (1,294 meters)		Sault Ste. Marie, Mich. (198 meters)		Seattle, Wash. (14 meters)		Washington, D.C. (10 meters)	
	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity
Surface	344	1.6	118	1.0	24	0.9	25	1.7	117	1.4	15	1.6	33	0.7	96	1.6	142	1.9	13	0.4	158	0.6	327	1.4
500	14	.6	99	.7	314	.4	14	3.0	135	2.0	137	.8	326	1.5	93	1.7	289	1.4	289	1.4	179	3.2	292	6.0
1,000	124	1.8	141	3.4	292	4.5	229	.9	149	2.3	246	2.1	315	6.1	348	.5	315	5.5	200	4.0	293	9.1	293	9.1
1,500	142	2.0	168	4.6	304	6.6	269	4.4	211	2.9	290	3.5	315	8.4	265	.8	172	2.6	312	9.5	203	5.2	301	11.0
2,000	215	.4	196	5.8	299	9.2	282	5.6	206	3.4	302	4.3	311	11.3	245	1.5	193	3.2	306	9.2	198	4.8	294	11.6
2,500	209	2.4	207	7.7	299	11.2	296	7.2	212	4.2	301	6.7	307	14.3	245	3.0	229	2.6	307	9.7	191	4.0	291	12.7
3,000	227	2.5	213	6.9	304	11.4	298	8.5	229	2.9	310	7.9	310	15.9	250	4.8	245	3.3	319	12.1	193	4.4	291	12.7
4,000	227	2.5	213	6.9	304	11.4	298	8.5	229	2.9	310	7.9	310	15.9	250	4.8	245	3.3	319	12.1	193	4.4	291	12.7
5,000	298	2.7	213	8.2	304	11.4	298	8.5	229	2.9	310	7.9	310	15.9	250	4.8	245	3.3	319	12.1	193	4.4	291	12.7
									35	.7		10.6	287	7.8	283	11.1	270	2.9						

## RIVERS AND FLOODS

By RICHMOND T. ZOCH

[River and Flood Division, MONTROSE W. HAYES, in charge]

In February there was a flood in the Cottonwood and other small creeks, near Red Bluff, Calif. The flood was caused by a local downpour and did considerable damage.

Most of the rivers where a regular flood service is maintained were low during the month. The lower Mississippi River was unusually low. The mean stage during the month at Memphis, Tenn., was the lowest during the

past 45 years; however, at New Orleans it was not quite so low as in 1931.

Late in the month floods occurred in a few rivers of the Ohio Valley and the Southeastern States. As most of these floods continued well into March a discussion of them and of ice movement in rivers in February will appear in a later issue of the MONTHLY WEATHER REVIEW.

## WEATHER OF THE ATLANTIC AND PACIFIC OCEANS

[The Marine Division, WILLIS E. HURD, acting in charge]

## NORTH ATLANTIC OCEAN

By HERBERT C. HUNTER

**Pressure.**—The average pressure over the North Atlantic during February 1934 was generally higher than normal, and over the northeastern portion was much above normal, Valencia, Ireland, averaging 0.61 inch above. There was a slight deficiency indicated at a few southwestern island stations. (See table 1.) The lowest pressure reading yet reported on shipboard this month was 28.84 inches, which is considerably higher than the lowest readings usually reported during winter months. This was noted not quite 300 miles south of Sable Island, on the 13th, by the British S.S. *San Tirso*. Among land stations, Halifax, Nova Scotia, noted a slightly lower reading that day, and Julianehaab, Greenland, a considerably lower reading on the following day. Also Nantucket recorded a pressure of 28.81 inches on the 20th.

TABLE 1.—Averages, departures, and extremes of atmospheric pressure (sea level) at selected stations for the North Atlantic Ocean and its shores, February 1934

Stations	Average pressure	Departure	Highest	Date	Lowest	Date
	Inches	Inch	Inches		Inches	
Julianehaab, Greenland	29.50	—	30.12	18, 19, 24	28.55	14
Reykjavik, Iceland	29.78	+0.24	30.62	26	29.14	24
Lerwick, Shetland Islands	30.05	+0.33	30.69	1	29.84	8
Valencia, Ireland	30.51	+0.61	30.92	15	29.85	24
Lisbon, Portugal	30.24	+0.14	30.58	15	29.96	5
Madeira	30.09	+0.02	30.24	20	29.91	19
Horta, Azores	30.32	+0.17	30.57	4	29.98	12
Belle Isle, Newfoundland	29.81	+0.06	30.38	18	29.16	24
Halifax, Nova Scotia	29.95	+0.04	30.66	28	28.82	13
Nantucket	30.04	—	30.83	28	28.81	20
Hatteras	30.16	+0.05	30.84	28	29.41	12
Bermuda	30.10	—0.02	30.46	28	29.62	13
Turks Island	30.06	—0.02	30.18	24, 28	29.92	17
Key West	30.10	+0.03	30.31	27	29.88	12
New Orleans	30.16	+0.07	30.63	27	29.72	25
Cape Gracias, Nicaragua	29.99	+0.04	30.10	23	29.94	18 to 21

NOTE.—All data based on a.m. observations only, with departures compiled from best available normals related to time of observations, except Hatteras, Key West, Nantucket, and New Orleans, which are 24-hour corrected means.

**Cyclones and gales.**—Reports so far received indicate that gales were somewhat less frequent than usual over the North Atlantic during February. They were especially few over the eastern and central portions of the chief steamship lanes between North American ports and the English Channel. However, in and near the Bay of Biscay and to southwestward toward the region of the Azores, gale force was attained on a few days, but nearly always with wind from a northerly direction and with least pressure either above or almost up to 30 inches. The most notable of these reports was one of force 11, about 200 miles off the coast of Portugal, on the 2d, encountered by Belgian S.S. *Makala*. (See chart VIII.)

The first 2 days brought numerous reports of gales over American coastal waters from the Carolinas to Newfoundland. On the morning of the 1st the southernmost of a series of low-pressure areas was central over Georgia, whence it advanced northeastward to the northern portion of the Gulf of St. Lawrence by the evening of the 2d, increasing greatly in intensity. Thereafter the advance was toward the north-northeast, so that scarcely any other vessels on the usual routes were affected by the winds connected with it. The first of the two reports of wind of hurricane strength is related to this cyclone; the British S.S. *Polycarp* reported force 12 during the early hours of the 2d, approximately 300 miles east-northeast of Hatteras.

From the 3d to the 8th, inclusive, very few gales were noted; and none from between the 10th and 55th meridians.

From late on the 8th, near the coast of Georgia, gales were encountered over a narrow strip extending north-eastward to within about 500 miles of Ireland, where the wind was strongest on the 12th. Before this storm ceased to affect the steamship lanes another, which proved somewhat more important, started over nearly the same path.